

CLAIMS

1. Light source monitoring apparatus comprising:

a light source designed to produce a beam of light, the light source including drive electronics connected to the light source to supply an amount of drive current to the light source;

a monitor diode connected to the drive electronics for controlling the amount of drive current supplied to the light source by the drive electronics;

a lens system positioned to receive the beam of light from the light source and transmit substantially all of the beam of light to a light terminal, the lens system including an optical element; and

a light reflecting surface on the optical element positioned to reflect a portion of the beam of light onto the monitor diode.

2. Light source monitoring apparatus as claimed in claim 1 wherein the lens system includes a first lens element adjacent the light source and a second lens element adjacent the light terminal.

3. Light source monitoring apparatus as claimed in claim 2 wherein the first lens element adjacent the light source provides more optical power than the second lens element.

4. Light source monitoring apparatus as claimed in claim 1 wherein the second lens element is a focusing lens having a curved light outlet side and a light inlet side, and the light inlet side includes the light reflecting surface.

5. Light source monitoring apparatus as claimed in claim 4 wherein the light inlet side of the second lens element includes a flat surface directed at an angle to light impinging on the second lens element from the light source.

6. Light source monitoring apparatus as claimed in claim 2 wherein the second lens element includes a molded plastic lens.

7. Light source monitoring apparatus as claimed in claim 2 wherein the optical element is positioned between the first and second lens elements and the optical element defines a light inlet surface including the light reflecting surface.

8. Light source monitoring apparatus as claimed in claim 7 wherein the optical element includes a light transmitting window.

9. Light source monitoring apparatus as claimed in claim 2 wherein the first lens element includes a curved reflecting surface.

10. Light source monitoring apparatus as claimed in claim 1 wherein the light source includes a laser.

11. Light source monitoring apparatus as claimed in claim 1 wherein the light terminal includes an end of an optical fiber.

12. Light source monitoring apparatus comprising:

a light source designed to produce a beam of light, the light source including drive electronics connected to the light source to supply an amount of drive current to the light source;

a monitor diode connected to the drive electronics for controlling the amount of drive current supplied to the light source by the drive electronics;

a lens system positioned to receive the beam of light from the light source and transmit substantially all of the beam of light along an optical axis to a light terminal, the lens system including a first lens element positioned along the optical axis and adjacent the light source and a second lens element positioned along the optical axis and adjacent the light terminal; and

a light reflecting surface in the lens system and positioned along the optical axis to reflect a portion of the beam of light at an angle to the optical axis onto the monitor diode.

13. Light source monitoring apparatus as claimed in claim 12 wherein the first lens element adjacent the light source provides more optical power than the second lens element.

14. Light source monitoring apparatus as claimed in claim 12 wherein the second lens element is a focusing lens having a curved light outlet side and a light inlet side, and the light inlet side includes the light reflecting surface.

15. Light source monitoring apparatus as claimed in claim 14 wherein the light inlet side of the second lens element includes a flat surface directed at an angle to the optical axis.

16. Light source monitoring apparatus as claimed in claim 12 wherein the second lens element includes a molded plastic lens.

17. Light source monitoring apparatus as claimed in claim 12 wherein a third optical element is positioned between the first and second lens elements and the third optical element defines a light inlet surface including the light reflecting surface.

18. Light source monitoring apparatus as claimed in claim 17 wherein the third optical element includes a light transmitting window.

19. Light source monitoring apparatus as claimed in claim 12 wherein the first lens element includes a curved reflecting surface.

20. Light source monitoring apparatus as claimed in claim 12 wherein the light source includes a laser.

21. Light source monitoring apparatus as claimed in claim 12 wherein the light terminal includes an end of an optical fiber.

22. Light source monitoring apparatus comprising:

a first structural portion;

a light source mounted by the first structural portion and designed to produce a beam of light, the light source including drive electronics connected to the light source to supply an amount of drive current to the light source;

a first lens element mounted by the first structural portion and positioned adjacent the light source;

a second structural portion, the second structural portion being constructed to receive an optical fiber in optical communication therewith;

a second lens element mounted by the second structural portion and positioned to be adjacent an end of the optical fiber, the first and second lens elements defining an optical axis; and

a light reflecting surface positioned along the optical axis between the first and second lens elements to reflect a portion of the beam of light at an angle to the optical axis onto the monitor diode.

23. Light source monitoring apparatus as claimed in claim 22 wherein the second lens element is a focusing lens having a curved light outlet side and a light inlet side, and the light inlet side includes the light reflecting surface.

24. Light source monitoring apparatus as claimed in claim 23 wherein the light inlet side of the second lens element includes a flat surface directed at an angle to the optical axis.

25. Light source monitoring apparatus as claimed in claim 22 wherein the second lens element includes a molded plastic lens.

26. Light source monitoring apparatus as claimed in claim 22 wherein a third optical element is positioned between the first and second lens elements and the third optical element defines a light inlet surface including the light reflecting surface.

27. Light source monitoring apparatus as claimed in claim 26 wherein the third optical element includes a light transmitting window.

28. Light source monitoring apparatus as claimed in claim 22 wherein the first lens element includes a curved reflecting surface.

29. Light source monitoring apparatus as claimed in claim 22 wherein the light source includes a laser.